



Competency 1.14 Industrial hygiene personnel shall demonstrate the ability to verify the effectiveness of control measures and/or control system performance.

1. Supporting Knowledge and Skills

- a. Discuss how the following are used to verify the effectiveness of control measures:
 - Instrument calibration and operation
 - Data collection
 - Adjusting sampling plan to meet conditions
 - Applying investigative techniques
 - Recording multiple exposures
 - Adequacy of samples
- b. Compare obtained results to expected results and discuss their significance.
- c. Discuss the use, capabilities, and limitations of ventilation equipment.
- d. Discuss stack sampling
- e. Discuss how employee feedback may be used to verify control measure effectiveness.
- f. Discuss how factors such as hazard potential, process change, equipment life, etc., can be used in determining the schedule for re-evaluation of control measures.
- g. Conduct an evaluation of planned and existing control measures and determine their effectiveness to ensure personnel and/or environmental protection.

2. Recommended Reading

Review

- DOE-STD-1054-93, *Guideline to Good Practices for Control and Calibration of Measuring and Test Equipment (M&TE) at DOE Nuclear Facilities*.
- *Fundamentals of Industrial Hygiene*, 3rd Edition, National Safety Council, Chapter 16, "Evaluation," and Chapter 17, "Methods of Evaluation."
- *Industrial Ventilation: A Manual of Recommended Practice*, American Conference of Governmental Industrial Hygienists.



3. Summary

The verification of the effectiveness of control measures is a subset of workplace surveillance and is performed similarly to any other workplace assessment.

There may be two different reasons for verifying the effectiveness of control measures: (1) to verify performance in accordance with a design criteria, and (2) to verify actual control of exposure to an agent through employee monitoring. Verification of the former is generally quite easy, e.g., one selects the controls to be evaluated, determines their appropriate design criteria, and verifies performance with respect to that criteria, such as measuring the apparent face velocity of an exhaust system or the apparent static pressure level that demonstrates face velocity.

To verify the accuracy and effectiveness of control settings, actual personal monitoring should be performed. Once settings have been established, more cursory verification of the operation in accordance with design criteria will be appropriate, but because of demonstrated exposure potential, periodic personal monitoring should probably also be performed to supplement operational verification. Verification of controls through operational indicators should probably include the verification that assumed exposure variables have not changed since the implementation of the control.

There is no minimal frequency required for the verification of control effectiveness, except as required in certain expanded OSHA standards, e.g., effectiveness of ventilation intended to prevent general industrial lead overexposure be assessed quarterly. Good practice and responsible use of resources would indicate that controls implemented to prevent actual overexposure should be verified regularly, between quarterly and annually, depending on the danger of the agent and frequency of exposure. Controls simply in place for operations where, in the professional judgment of the industrial hygienist there is no real possibility of significant exposure currently even without any controls in place, are in much less need of verification. The principal risk in these cases is that the relatively valueless controls may, unbeknownst to the industrial hygienist, be adapted for some other purpose without his or her knowledge with unpredictable results. The industrial hygienist should use professional judgment to determine which controls require periodic testing, and the frequency of this testing.

4. Suggested Exercises

Please refer to Scenario 6 in the Scenario section of this document.